Appendix 2

A Decision Tree ("Key") Approach to Tooth Identification

Learning to identify isolated teeth is difficult. The task of differentiating the 52 possible anatomically normal (*i.e.,* nonpathological, nonidiosyncratically variant) combinations of tooth type (I, C, P, M), dentition (permanent *vs.* deciduous), arcade (upper *vs.* lower), position (*e.g.,* P_3 *vs.* P_4), and side can seem daunting at first. With time and practice, these identifications will become much easier. A trained osteologist can make such an identification nearly instantaneously by comparing the unknown tooth to 26 familiar mental patterns (26 unsided patterns, or half of the total of 52 sided teeth) and then siding the unknown tooth.

In order to learn these visual patterns, the beginning osteologist must learn to make a series of observations and judgments about the morphology of the tooth to be identified. This hierarchy of judgments can be visualized as a decision tree (or identification key). The complete, illustrated decision tree (see Figure A2.1 for an overview) is too large to present as a single diagram in this book, so it has been broken down into thirteen segments (Figures A2.2–A2.14) in order to include the most useful criteria. You may find it helpful to copy these charts and then combine and recombine them as needed while you learn to identify isolated teeth. As you internalize the information presented in the charts, you will find that you need to refer to fewer and fewer charts in your identifications.

A2.1 Using the Decision Tree

Each of the decision trees is meant to be read starting at the leftmost node. From that node, there will be either two or three identification paths, each represented by an arrow. To determine which identification path to take, read the identification criteria that are printed over each arrow and select the path (arrow) whose identification criteria most closely match the characteristics of the tooth you are trying to identify. Using these decision trees, every one of the 52 possible normal human teeth can be identified by making no more than six choices between two (or sometimes three) possible answers (see Figure A2.1).

On each of the partial decision trees (Figures A2.2–A2.14), the possible choices are presented as paths (arrows) from a known starting point (at the far left) to one of a series of possible identifications (at the far right). A set of observations lies between these endpoints, arranged into two columns. The column on the right contains observations and comparative statements that you can use to judge which identification is more likely to be the correct one. The column on the

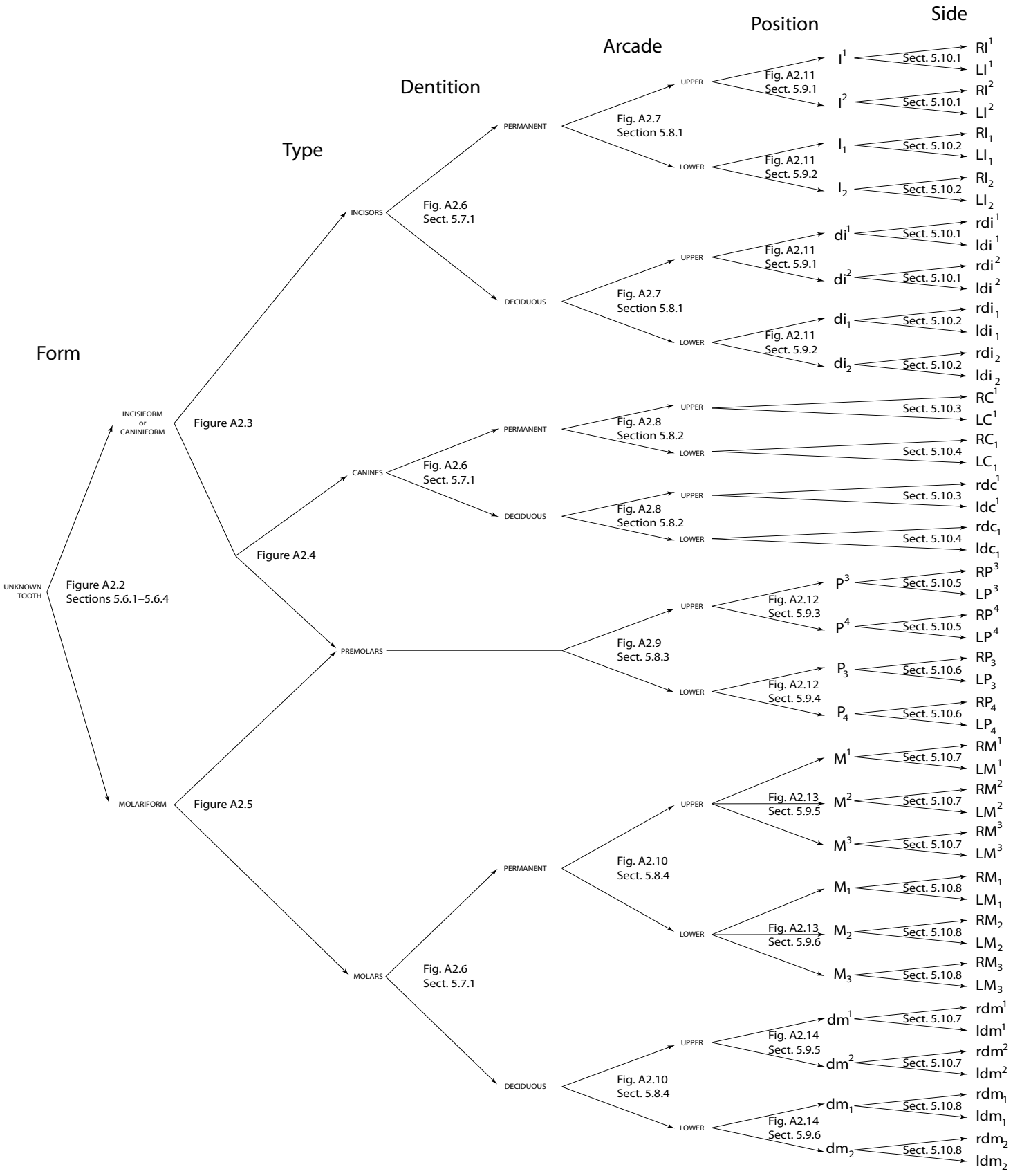

Figure A2.1 An overview of the complete decision tree that can be used to assist in the determination of dentition, tooth type, arcade, position, and side of an unidentified human tooth.

left contains observations that can serve as "shortcuts" to identifications. You will not always be able to use these shortcuts, but when you can, they will save you time in your identifications. When you arrive at an identification using a shortcut, however, always confirm that identification against all of the available evidence.

While many shortcuts to identification are available, always remember that there is no single, magic criterion that will always successfully distinguish one tooth from all others. Shortcuts will give you a good idea of the direction you should follow in your identification, but you should always use multiple criteria for each identification, checking each one independently and making your decision based on the majority of the evidence whenever there is conflict. The criteria to check include the number, location, and size of cusps, fissures, foveae, and other crown morphology; the number, location, and orientation of roots; the presence, placement, and shape of interproximal contact facets; and the location and orientation of occlusal contact facets. At each endpoint on the decision tree, you will find a reference to the relevant section of Chapter 5 for that tooth. Be sure to check your identifications against the descriptions given in these sections.

The decision trees presented here are intended for use on only anatomically normal human teeth; the presence of pathologies, malformations, or nonmetric traits may affect the accuracy of the identifications reached.

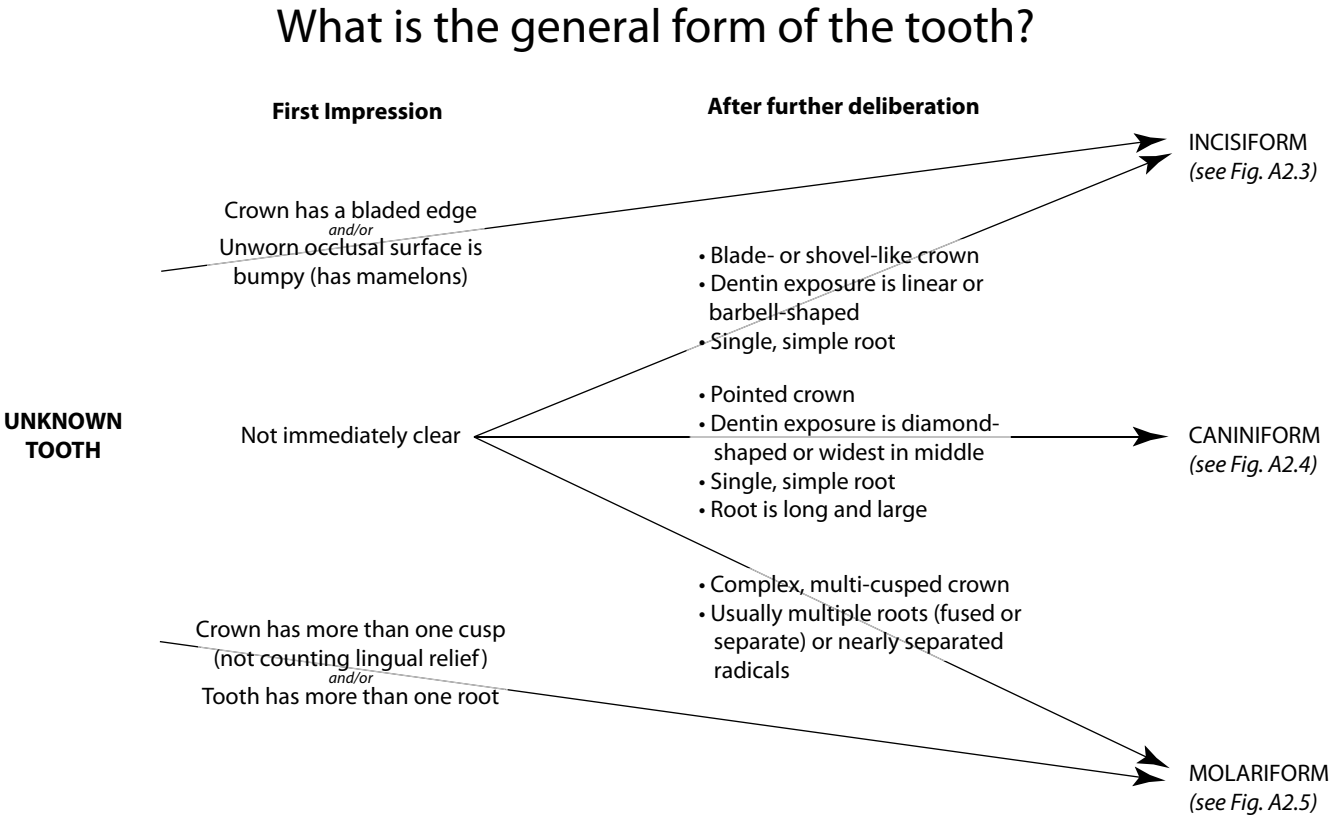

Figure A2.2 Partial decision tree for the determination of the general form of an unknown tooth.

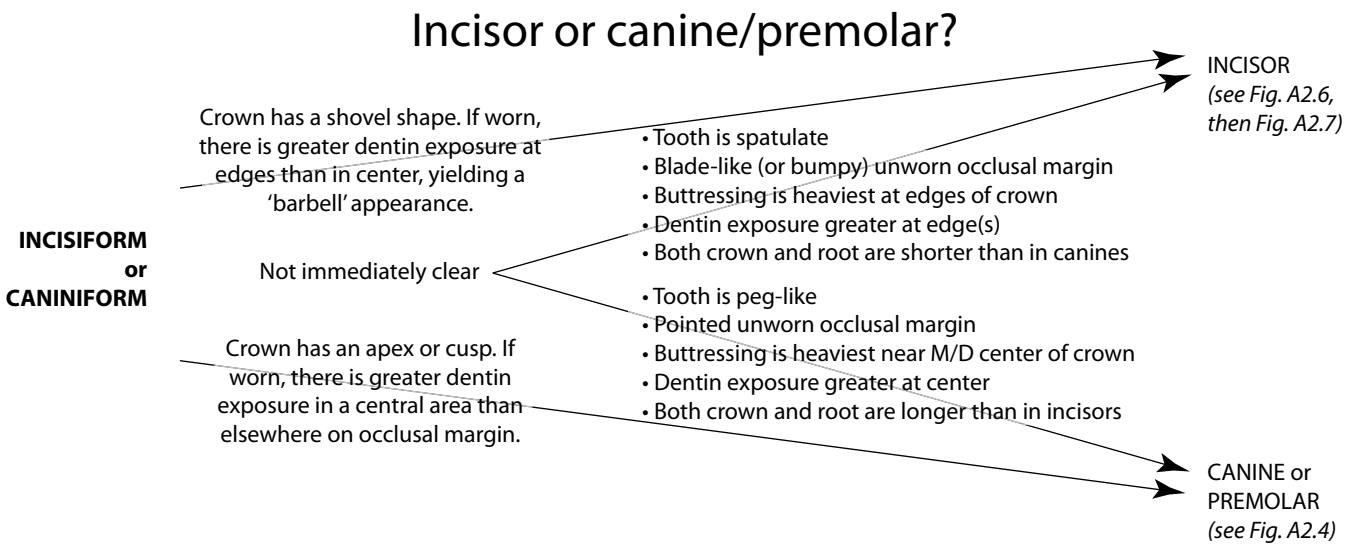

Figure A2.3 Partial decision tree for the determination of whether a nonmolariform tooth is an incisor or something else (*i.e.*, a canine or premolar).

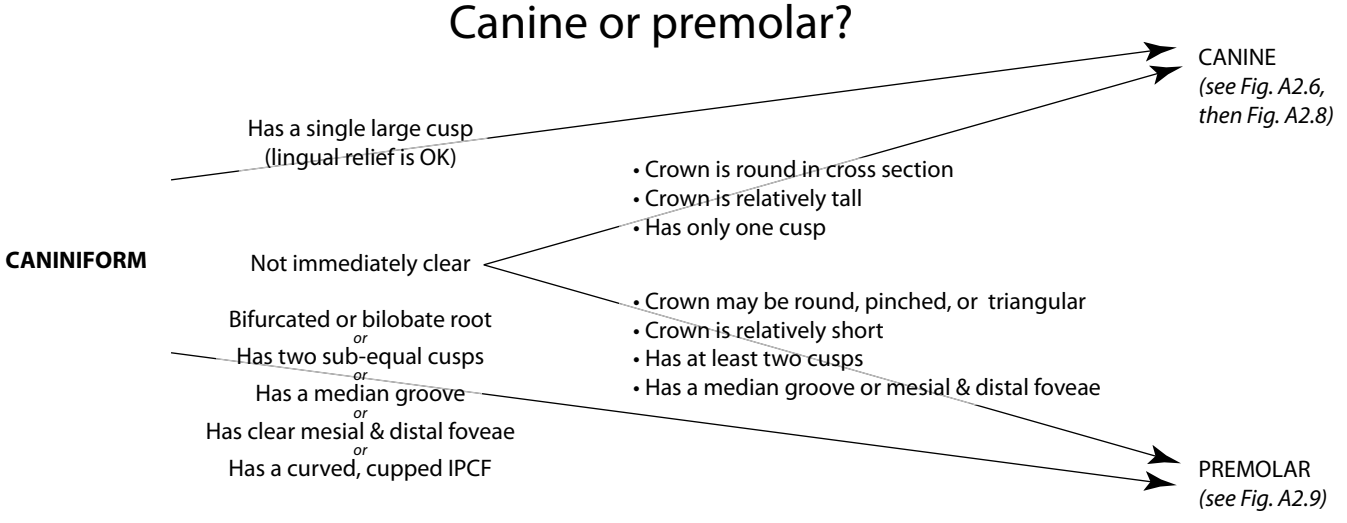

Figure A2.4 Partial decision tree for the determination of whether a nonmolariform tooth is a canine or a premolar.

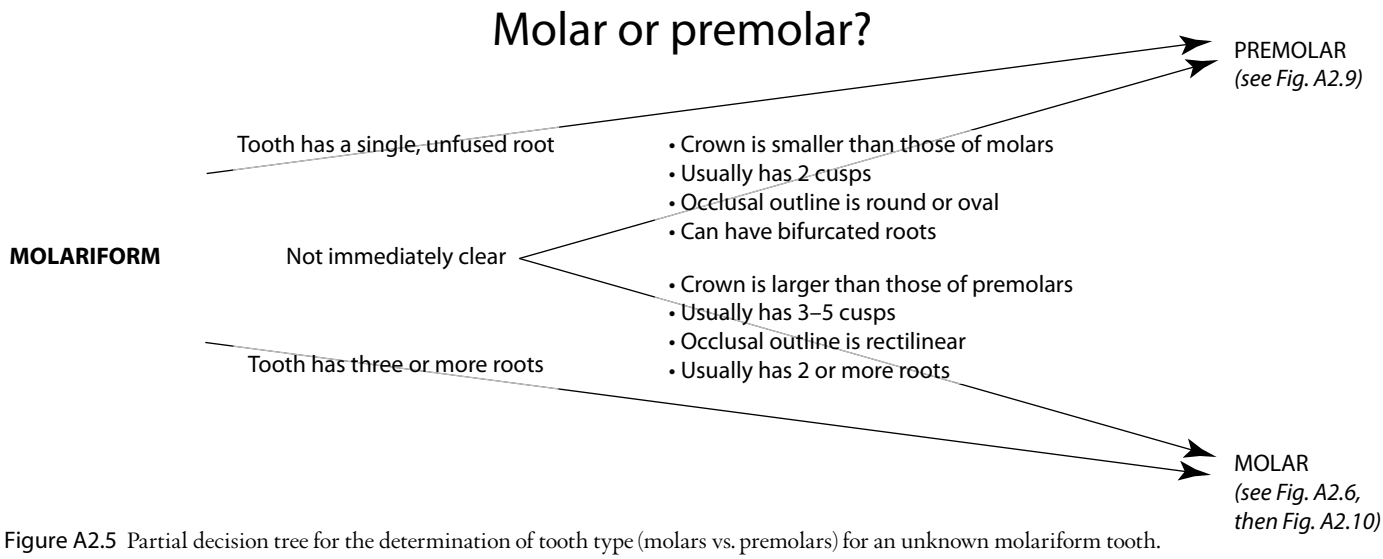

Figure A2.5 Partial decision tree for the determination of tooth type (molars vs. premolars) for an unknown molariform tooth.

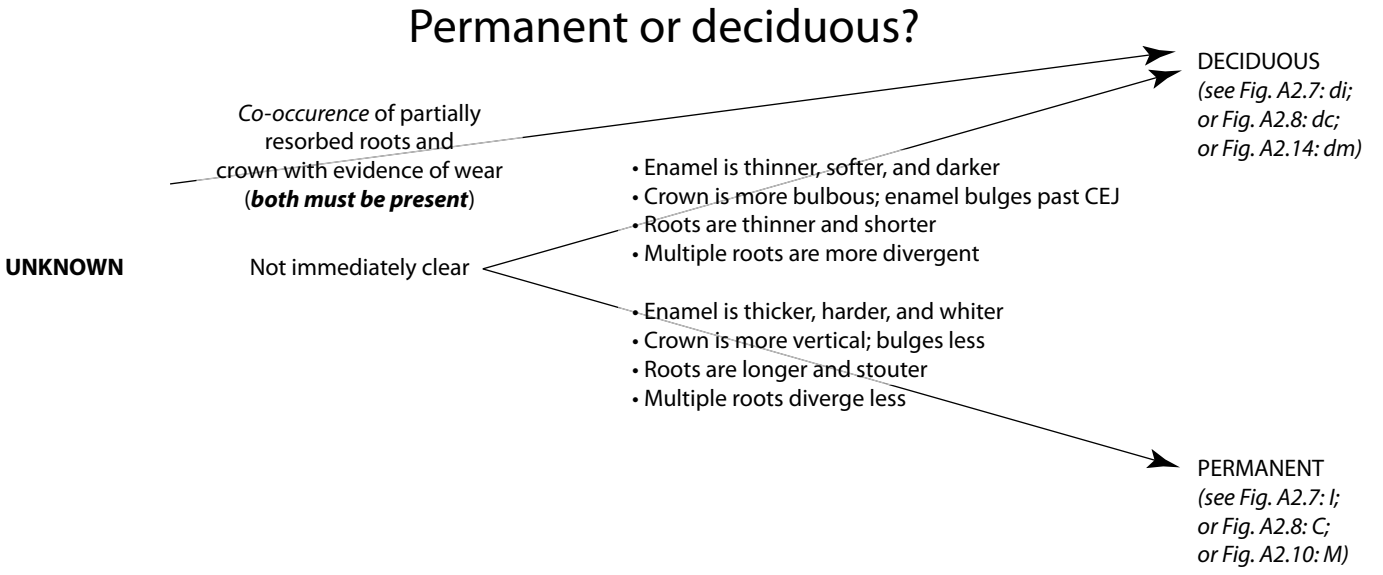

Figure A2.6 Partial decision tree for the determination of the dentition (permanent vs. deciduous) for an unknown tooth.

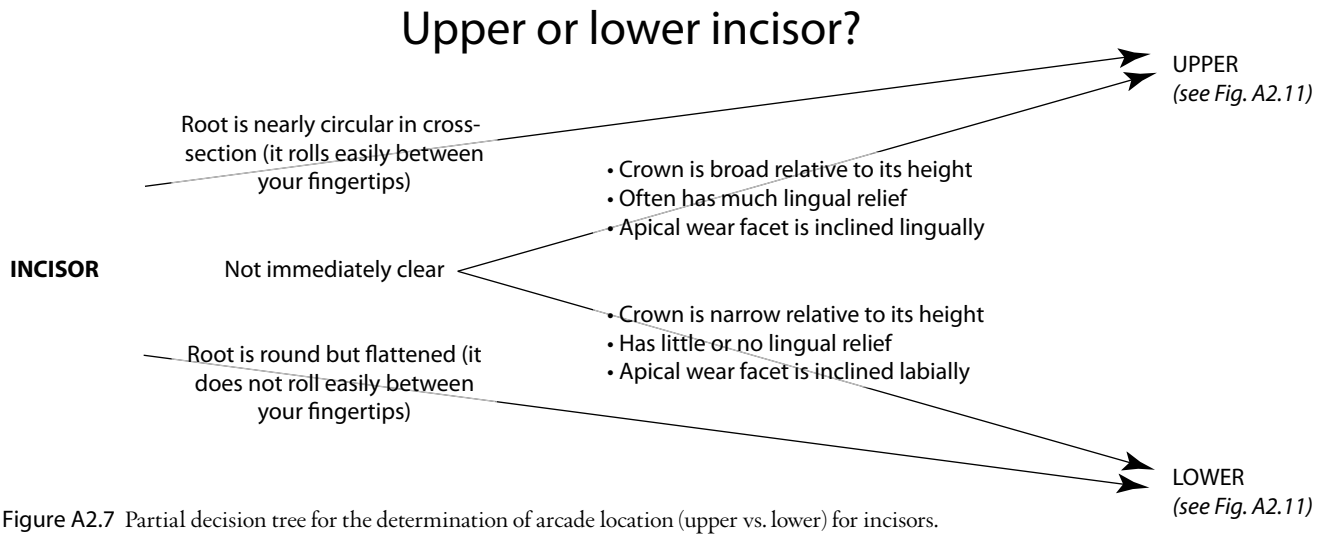

Figure A2.7 Partial decision tree for the determination of arcade location (upper vs. lower) for incisors.

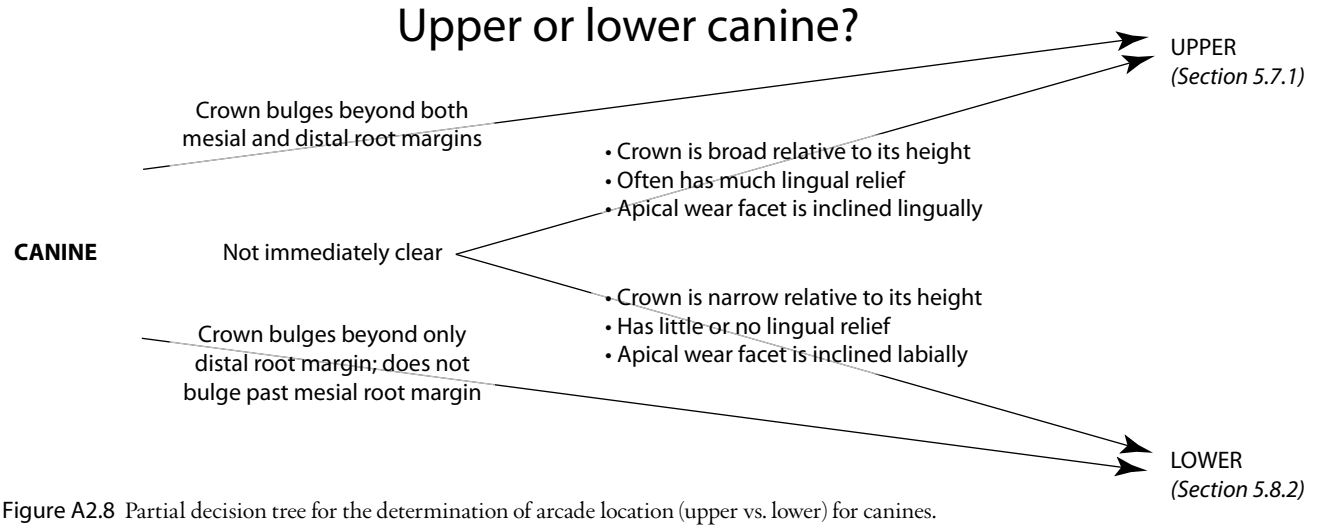

Figure A2.8 Partial decision tree for the determination of arcade location (upper vs. lower) for canines.

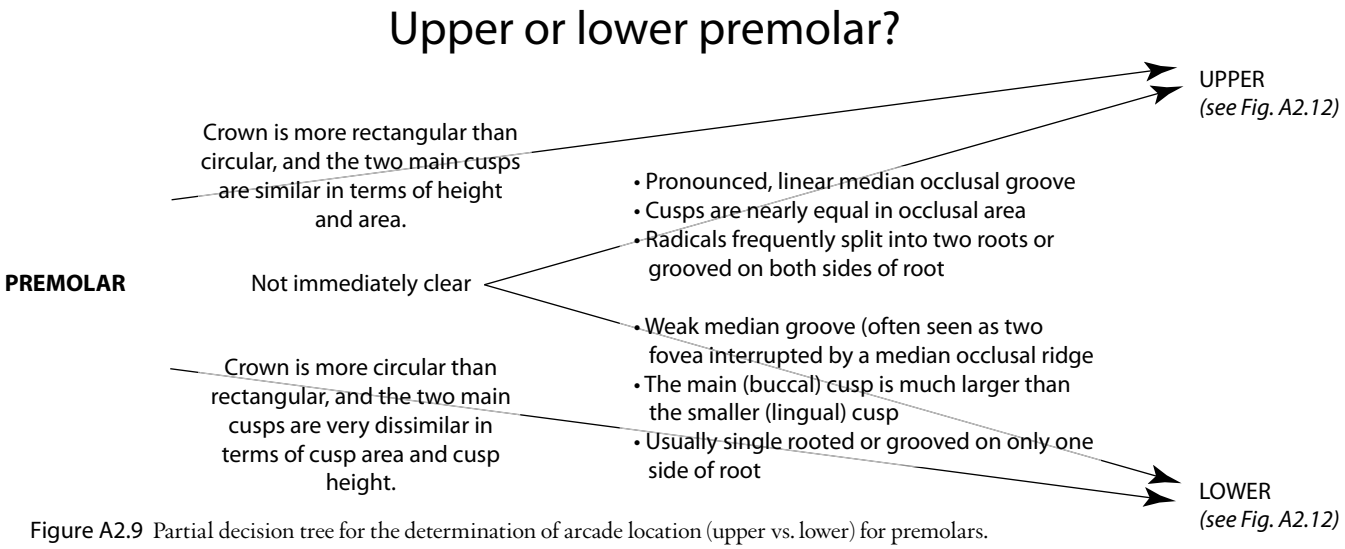

Figure A2.9 Partial decision tree for the determination of arcade location (upper vs. lower) for premolars.

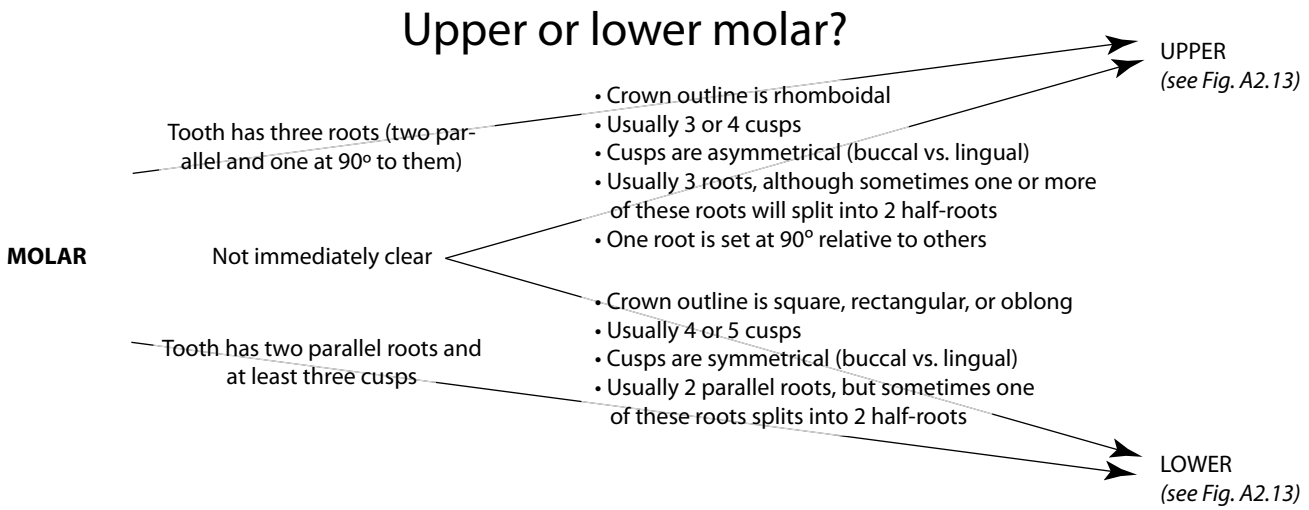

Figure A2.10 Partial decision tree for the determination of arcade location (upper vs. lower) for molars.

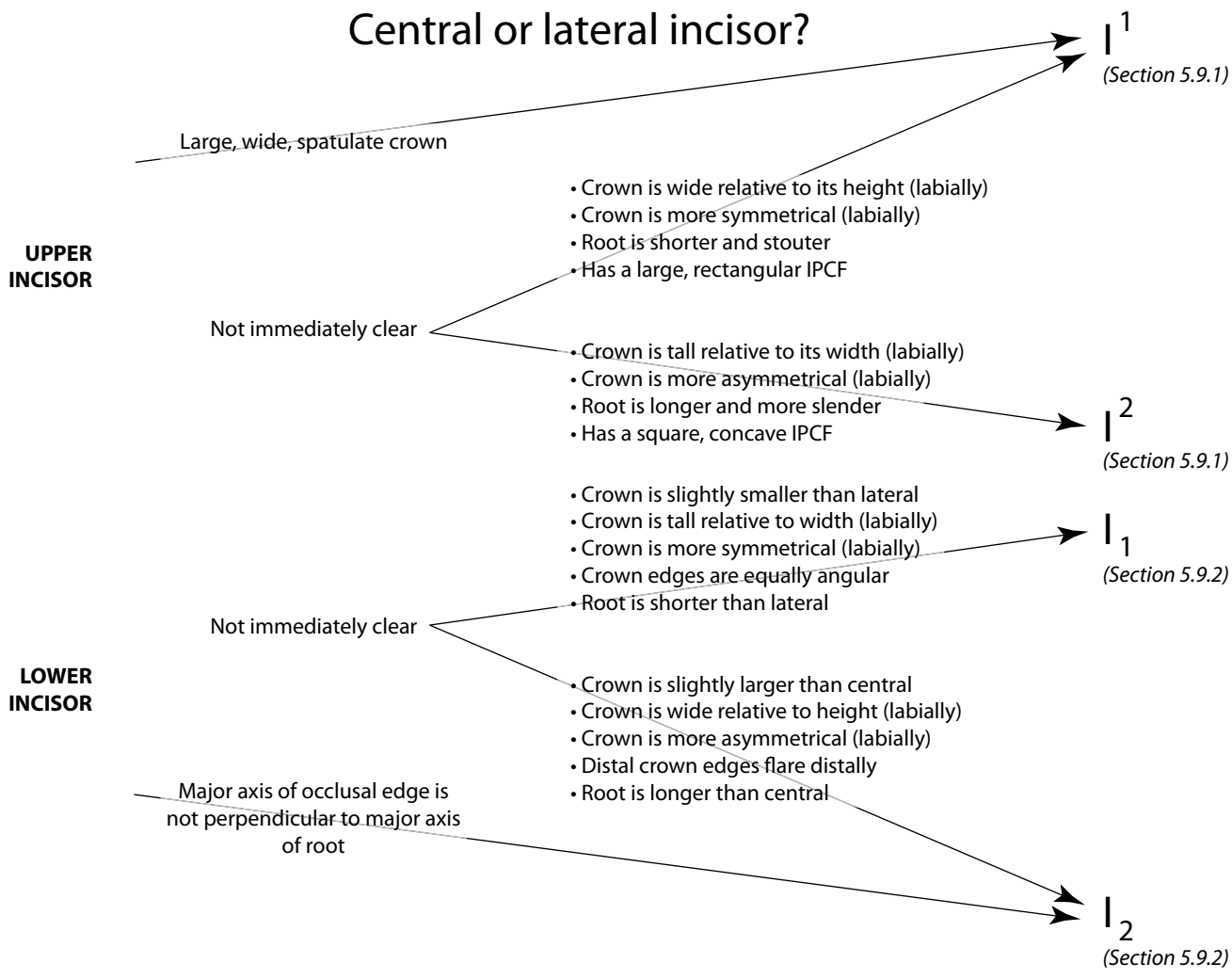

Figure A2.11 *Top:* decision tree for the determination of incisor position in the upper arch (I^1 vs. I^2). *Bottom:* decision tree for the determination of incisor position in the lower arch (I_1 vs. I_2).

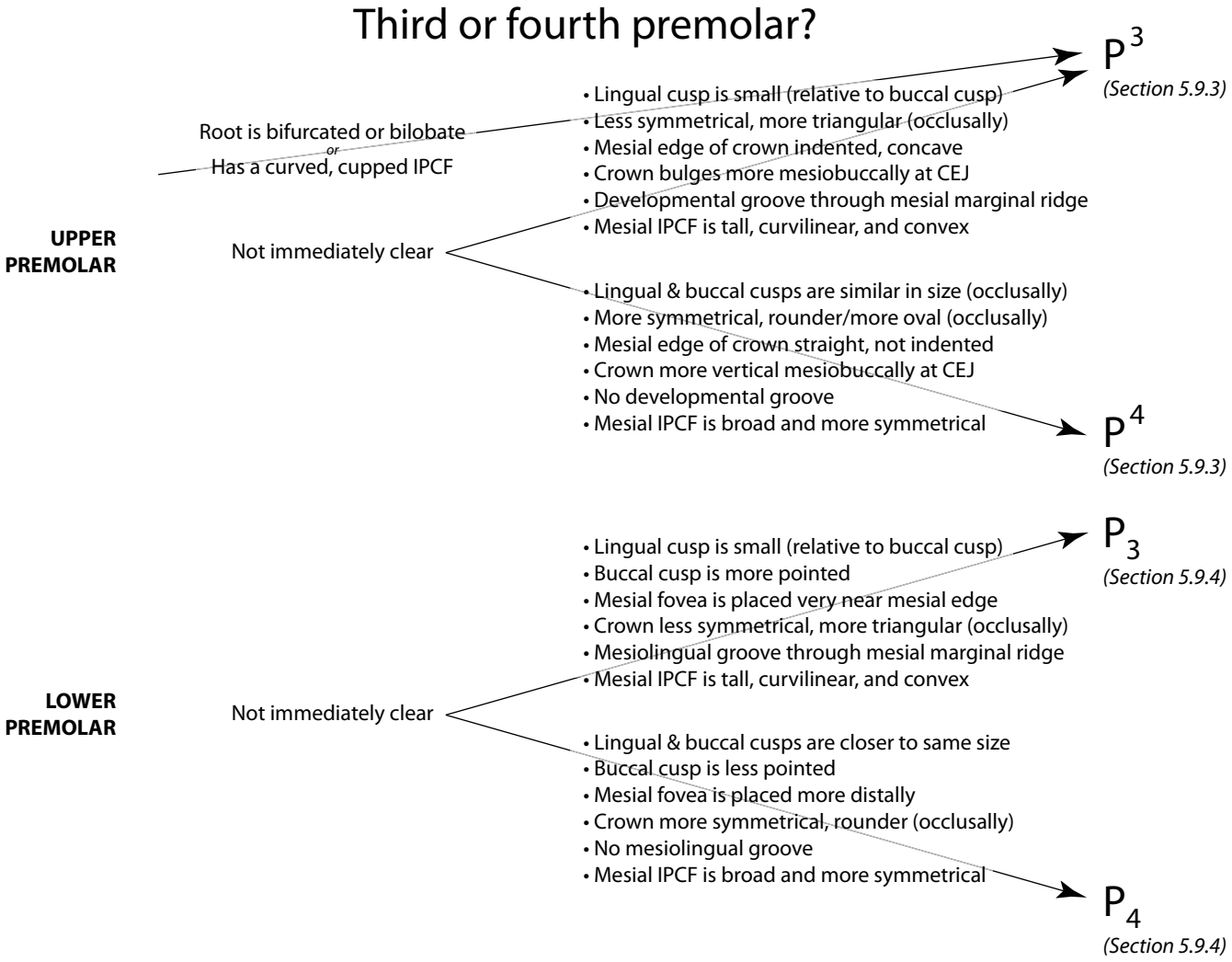

Figure A2.12 *Top:* decision tree for the determination of premolar position in the upper arch (P^3 vs. P^4). *Bottom:* decision tree for the determination of premolar position in the lower arch (P_3 vs. P_4).

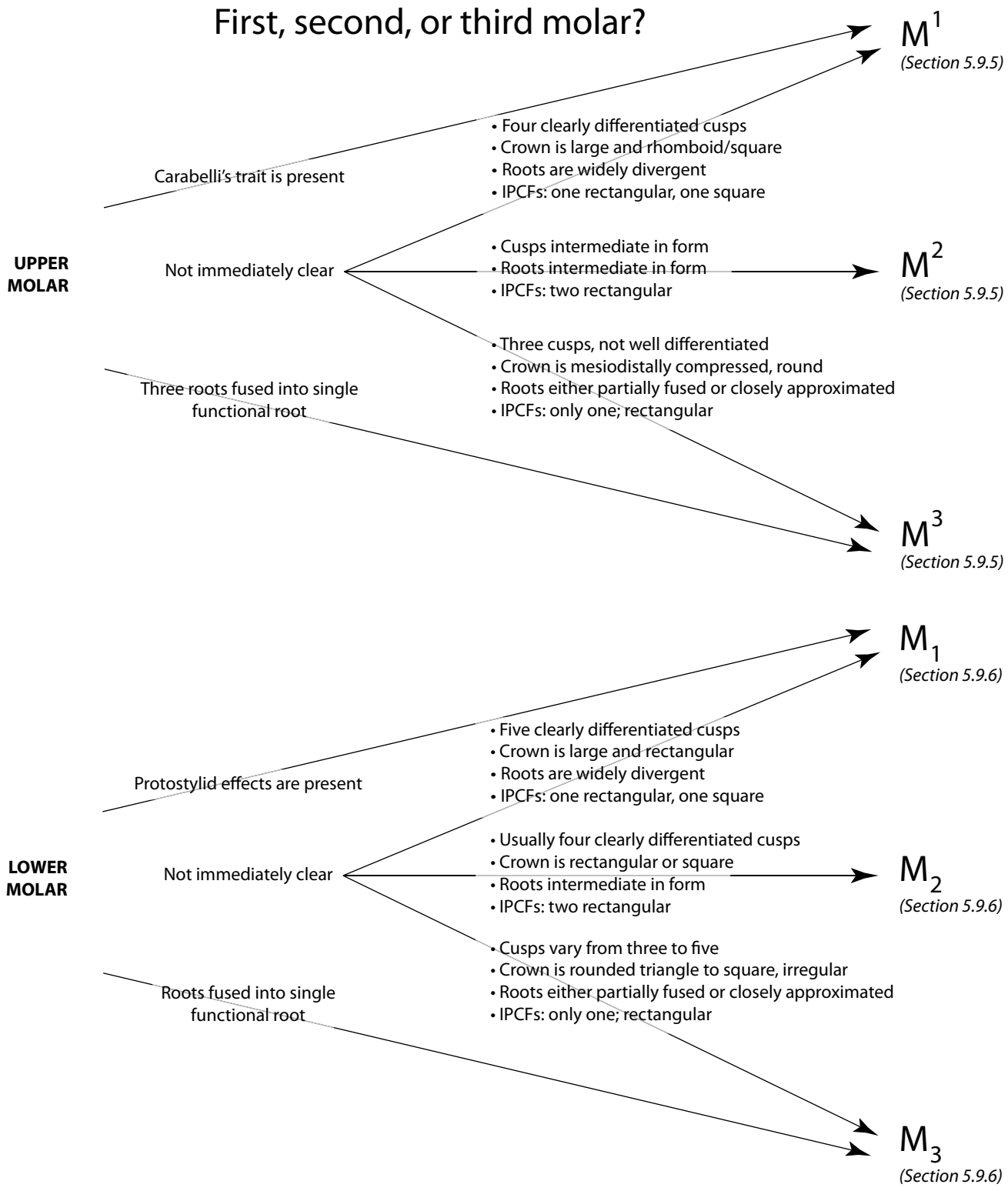

Figure A2.13 *Top:* decision tree for the determination of molar position in the upper arch (M^1 vs. M^2 vs. M^3). *Bottom:* decision tree for the determination of molar position in the lower arch (M_1 vs. M_2 vs. M_3).

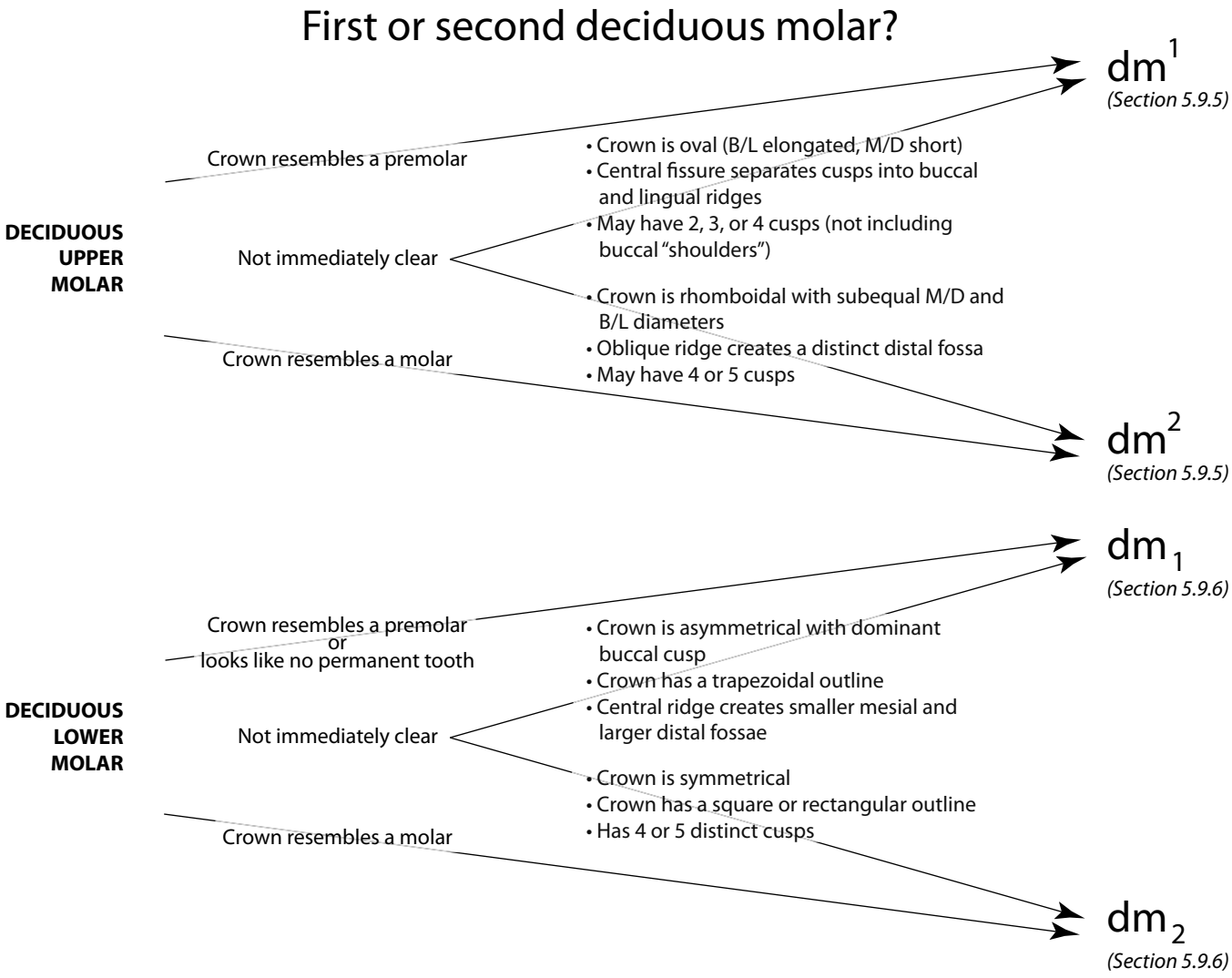

Figure A2.14 *Top:* decision tree for the determination of deciduous molar position in the upper arch (dm^1 vs. dm^2). *Bottom:* decision tree for the determination of deciduous molar position in the lower arch (dm_1 vs. dm_2).